

3-D SELECTION AND MANIPULATION  
WITH A MULTIPLE DIMENSION HAPTIC INTERFACE

Abstract

Systems and methods provide a user the ability to select three-dimensional virtual objects in a three-dimensional modeling environment using two-dimensional representations of the objects. In broad overview, the invention involves a multidimensional degree of freedom haptic interface that controls a three-dimensional cursor. A user employs the cursor to select an arbitrary point on a three-dimensional virtual object of interest. Through the application of a mathematical transformation, the system displays the cursor at the location of the selected point on the object. The user can manipulate the object by operating the haptic interface. The systems and methods provide the user with the possibility of editing the selected virtual object. In one embodiment, editing includes sculpting the object. When the user releases the object after manipulation is completed, the cursor is relocated to the position the cursor would have had had the manipulations been applied to the cursor directly.